INTRODUCTION

Studies on intergestural timing provides an opportunity to understand not only the coordination patterns [1, 2] but also the flexibility of these coordination [3, 4].

For example for within-segment intergestural timing, largely fixed timing relations are exhibited across contextual variations due to its tight coupling structures. But...

For within-segment timing variability, will the variability change as a function of syllable position or will it remain stable due to the relatively fixed within-segment timing relations?

To investigate this, we examine timing variability across prosodic modulations in multi-gestural segments, focusing on velum and oral gestures in Seoul Korean nasal sequences.

METHODS

Data acquisition

Real-time Magnetic Resonance Imaging speech production data of the midsagittal vocal tract (temporal resolution: 12ms/frame)

Subjects

Five native Seoul Korean speakers

Stimuli

Syllable-onset nasals (/n#n/), syllable-coda nasals (/n#p/, /n#t/), & juncture germinante nasals (/n#n/) across three boundary/focus conditions (Wd, AP, & AP+focus; 7/8 reps each)

Data analysis

Velum (VEL): Velum centroid tracking analysis [5]

Tongue Tip (TT): Region-of-interest image sequence analysis [6]

Measurements

Onset lag: the interval from the VEL lowering onset to the TT onset

O-R lag: the interval from TT onset to VEL raising onset (= articulatory duration of consonant nasalization)

Statistical testing

Linear mixed effects models for mean lags, and Coefficients of Variation (CoV) [7] using modified signed-likelihood ratio test [8] for comparing variances.

CONCLUSION

This study reveals articulatory grounding for phonological phenomena commonly observed in Korean such as onset denasalization or nasal weakening [9, 10].

• Korean onset nasals have a shorter duration of nasality than the coda nasals and are associated with greater variability.

REFERENCES


RESULTS

Onset lags: onset nasals = coda nasals = germinante nasals

• The positive lag indicates that VEL precedes TT

Greater timing variability in the onset nasals

• CoV: onset /n/ > coda /n/ & germinate /n#n/

Greater timing variability in the coda nasals

• O-R lags: onset nasals (near-zero) < coda & germinate nasals

• A near-zero O-R lag is indicative of almost no consonant nasality

Greater timing variability in the juncture nasals

• CoV: onset /n/ > coda /n#p/ > coda /n#t/ & /n#n/